# SUBJECT INDEX


Adipose tissue, diet effects 51–56
  fatty acid proportions 45
  lipid composition 39–58
    age 41, 42
    species 40, 41
  phospholipids 48–51
  Polynesian and diet 54
  stereospecific analysis 45–47
  triacylglycerol 42–48
cAMP synthesis and thyroid hormones 229–232
Antioxidants, HPLC 27–29
Antiporter, $Na^+$-$H^+$-, thyroid hormones 240, 241
Archaebacteria
  features 153, 154
  halophiles 163
  methanogens 163, 164
  RNA 153
  structural types 162–165
  thermophiles 164
Archaebacteria, lipids 153–173
  isoprenoid glycerolipid 155–165
  isoprenoid quinone 165–173
Argentation chromatography 30, 31, *see also* HPLC
Atherogenesis, HEPEs 314–316
ATPase and thyroid hormones 233–238
  calcium 233–235
  sodium-potassium 235–238

Bacteria, phosphoethanolamine methylation 75

Cell movement and HETE 309–311
Cholesteryl esters, adipose tissue 56, 58
Chromatography *see also* individual procedures
  supercritical fluid 32–34
Corticosterone, HETE effects 301, 302
Cotransporters, $Na^+$-$K^+$-, and thyroid
    hormones 329, 240
Covalent fatty acids
  myristate linkage 186
  palmitate linkage 179
  proteins modified 179–190
    list 180
Covalent lipids
  identification 178
  protein modification 177–194
    mechanism 178
Cyclooxygenase pathway, platelet fatty
    acids 141–143

Diet
  adipose tissue composition 51–56
    Polynesian 54
    sheep 55
  experimental design 94
  polyunsaturated fatty acids in skin 93
Diradylglycerols
  high temperature capillary GLC 130
  qualitative GLC analysis 117, 118
  quantitative GLC analysis 123

Erythropoietin, HETE effects 302
Essential fatty acid deficiency
    and epidermis 94–98
    DNA synthesis 95
    and mitochondrial oxidative
    phosphorylation 257, 258
    primrose oil 94, 95

Fatty acids
  HPLC 11–16
    applications 18
  long chain, biosynthesis 86, 87
  methyl esters
    argentation thin layer chromatography 88, 89
    reverse phase HPLC 90, 91
Fungi, phosphatidylethanolamine methylation 75, 76

Gas–liquid chromatography (GLC)
  fatty acids 16
    vegetable oils 17
Gas–liquid chromatography (GLC),
    high-temperature capillary 107–132
  applications 128–131
  carrier gas 112, 113
  columns 112
    efficiency 118
  injection technique 110–112
  instruments 110
  method comparison 127, 128
  potential 127
  qualitative analysis 113–117
  quantitative analysis 118–126
Glycophospholipids
  anchor functions 193, 194
  anchor structure 191, 192
  biogenesis 192, 193
  protein modification 190–194
Glycosphingolipids, interdigitation 354, 355

HETE *see* hydroxyeicosatetraenoic acid
High-performance liquid chromatography
    (HPLC) 5–35
  advantages 5
  applications 11–32
  argentation 30–31
  column technology 6, 7
  detection systems 7–11
    characteristics 11
  injection solvents 23
  phenacyl esters of fatty acids 13
  preparative 31, 32
  soybean oil fatty acids 16
Hydrocarbons, adipose tissue 56
Hydroxyeicosatetraenoic acids (HETEs) 271–319
  cell incorporation 288
  cell movement 309–311
  chloride transport 303
  cyclooxygenase effects 303, 304
  enzymatic effects 303–307

formation 273–288
hormonal secretion 299–302
immune response 307–309
isomer production 286–288
membrane perturbation 293, 294
metabolic products 294–299
mitogenesis 311, 312
synthesis and structure 275
tissue injury 312–317
uptake 288–293
5-Hydroxyeicosatetraenoic acid (5-HETE)
cell uptake 292
metabolites 295
tissues producing 277–280
12-Hydroxyeicosatetraenoic acid (12-HETE)
cell uptake 292
metabolites 295–297
tissues producing 280–283
15-Hydroxyeicosatetraenoic acid (15-HETE)
cell uptake 293
metabolites 295, 297–299
tissues producing 281, 284–286
Hypothalamus–pituitary, HETE effects 302

Immune response, HETE effects 307
Inflammation, HETEs 312–314
Insulin, HETE effects 299–301
Interdigitation
acyl chain inequivalence 350
bilayer membranes 325–357
chemically-induced 336–346
alcohols 337, 338
anesthetics 341
chaotropic salts 345, 346
myelin basic protein 344, 345
polymixin 341–343
polyols 336
tris buffer 345
ether-linked lipids 346–349
forces 326, 327
fully 350
headgroup 349
and acyl chain 349
mixed systems 352
monolayer coupling 356
partial systems 355
positional isomers 349
pressure-induced 334, 335
structural modifications 346–349
types 327
X-ray diffraction 327, 329, 330
Ischaemia, HETE role 316, 317
Isoprenoid glycerolipids
archaebacteria 155–165
mass spectroscopy 158–160
nuclear magnetic resonance 160–162
structural types 155–158
tetraethers 156
Isoprenoid quinones
archaebacteria 165–173
distribution 170, 172
nuclear magnetic resonance 168–171
spectroscopic properties 167, 168
structural types 166, 167

Lipid profiles, high temperature capillary GLC 131
Lipids, nutritional, HPLC 26, 27
Lipoxygenase
enzymes 274
HETE effects 306, 307
reaction mechanism 273
5-Lipoxygenase 273, 275
12-Lipoxygenase 274–276
15-Lipoxygenase 274, 276
Lipoxygenase pathway
platelet fatty acid metabolism 143–145

Mass spectrometry, liquid chromatography 32
Membranes, interdigitated bilayer 325–357 *see also* interdigitation
acyl chains 328
length asymmetry 350–355
consequences 356, 357
differential scanning colorimetry 330
electron microscopy 333
electron spin resonance 333, 334
fluorescence 334
nuclear magnetic resonance 332, 333
thermophilic bacteria 349
thickness alteration 356, 357
vibrational spectroscopy 331, 332
Membranes and thyroid hormones 228–241
lipid composition 228, 229
permeability 239
Metamorphosis and thyroid hormones 223, 224
Mitochondrial oxidative phosphorylation
essential fatty acid deficiency 257, 258
fetal rats 254, 255
heart and brain 255, 256
hypo- and hyperthyroidism 243
state 3 respiration 248–254
ADP/ATP carriers 249, 250
ATP synthetase 252
cytochromes 250, 251
pyridine nucleotide transhydrogenase 253
state 4 respiration 245–248
thyroid hormones 241–259
Mucus secretion, HETE effects 308, 309
Myristoylated protein
biogenesis 187–189
functions 189, 190

Neutrophil degranulation, HETE effects 308

Palmitoylated protein
biogenesis 180–184
functions 184–186
Phosphatidylcholine, mixed-chain 352, 353
Phosphatidylethanolamine
CDP-choline pathway 71
methylation 61–76
development and cholime 71
hormonal effects 69, 70
lipoprotein secretion 72, 73
microorganism 75, 76
polar head group manipulation 73, 74
regulation 68–72
substrates 68
origin for methylation 74
Phosphatidylethanolamine-*N*-methyltransferase (PEMT)
cellular localization 66
kinetics 64, 65
phosphorylation 66, 67
purification 62–64
rat liver properties 62–67
specificity 65, 66
tissue distribution 67
Phosphodiesterase, thyroid hormones 232, 233

Phospholipase, HETE effects 305
Phospholipids
  in adipose tissue 48–51
    fatty acids 48, 50
    fatty aldehydes 50, 51
    species distribution 49, 50
    stereospecificity 52, 56
  HPLC 24–26
Plasmalogens, adipose tissue 58
Platelet-activating factor
  fatty acid metabolism 140, 141
  lipoxygenase activity 305, 306
Platelet activation
  fatty acid liberation 138–140
  phospholipase pathways 138–140
Platelets, fatty acid metabolism 135–148
  acylation 135
  interconversion 136
  monoenoic 137
  oxygenation 141–145
  phospholipid transfer 137, 138
  polyunsaturated fatty acids 136, 137
Platelet function
  cyclooxygenase products 145, 146
  lipoxygenase products 147
Polyunsaturated fatty acids in skin 84–86
  biosynthesis 87–92
  diet effects 92–96
  functional role 98–101
  scheme 101
Protein modification
  covalent fatty acids 179–190
  covalent lipids 177–194
  glycophospholipids 190–194
  myristoylated 186–190
  palmitoylated 179–186
Proteolipoprotein 177
Psoriasis 100
  HETE role 316

Renin–angiotensin–aldosterone system, HETE effects

Skin
  layers 82, 83
  linoleic acid desaturation 92, 93
  lipid composition 83
  lipogenesis 83, 84
  polyunsaturated fatty acids 84–86
  properties 81
  scheme 82
Skin lipids 81–103
  epidermal histology 94–98
  fatty acid composition 96–98
  polyunsaturated fatty acids and diet 92–98
  metabolism 101
  role 98–101
Sphingomyelin, mixed interdigitated system 353, 354
Steryl esters
  analysis 109
    qualitative gas liquid chromatography 116
    quantitative gas liquid chromatography 122
  high temperature capillary gas liquid chromatography 129, 130

Thin layer chromatography
  argentation 88, 89
  triglycerides 22
Thyroid hormones
  calorigenic 200, 201
  cell entry 201, 202
  cell lipid composition 202–205
  cell membranes 228–41
  cholesterol metabolism 212, 217–220
  cholesterol transport 220, 221
  fatty acid activation 211–213
  fatty acid deactivation 221–223
  fatty acid oxidation 224, 227
  fatty acid synthesis 205, 206
  gene expression 208–210
  glycerolipid synthesis 213–216
  ketogenesis 217
  lipolysis 216, 217
  metamorphosis in anurans 223, 224
  mitochondrial oxidative phosphorylation 241–259
  NADPH generation 210, 211
  prostanoid synthesis 227
  protein phosphorylation 206–208
Tocopherols, HPLC 28–30
Triacylglycerol
  adipose tissue 42–45
    diet effects 51, 53, 57
    species 57
  analysis 108, 109
    correction factor 125, 126
    qualitative GLC 114, 115
    quantitative GLC 119–122
  fatty acids 43–45
  high temperature capillary GLC 128, 129
  molecular species 47, 48
Triglycerides
  HPLC 16–24
    peak identification 33
    temperature 19
  isomer separation 31
  molecular extinction coefficients 21
  UV absorbance 20
Triiodothyronine ($T_3$) receptors and tissues 242

Wax esters
  analysis 109
    qualitative GLC 116, 117
    quantitative GLC 123
  high temperature capillary GLC 130